UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,182	01/11/2002	Sabina Houle	P 0276921 P12682	5990

7590 03/04/2004

Roger R. Wise, Esq.
PILLSBURY WINTHROP, LLP
725 South Figueroa Street
Suite 2800
Los Angeles, CA 90017-5406

EXAMINER	
DUONG, THO V	

ART UNIT	PAPER NUMBER
3743	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/042,182	Applicant(s) HOULE ET AL.	
	Examiner Tho v Duong	Art Unit 3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-17 and 26-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-17 and 26-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Receipt of applicant's amendment filed 1/29/2004 is acknowledged. Claims 1,4-17 and 26-35 are now pending.

Response to Arguments

Applicant's arguments with respect to claims 1,4-17 and 26-35 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1,4,5,15,16,26 and 27 are rejected under 35 U.S.C. 102(a) as being anticipated by Lin et al. (US 6,188,578). Lin discloses (figures 1 and 2) an integrated heat spreader (13) arranged to be adhesively affixed with a sealant (15) to a substrate (11), comprising a rectangular body (131); a solid continuous lip portion (132) substantially vertically oriented relative to the body portion; the lip portion (132) is considered to be solid continuous since it solidly extends from the body portion (131); and a plurality of step portions (more than 5) perpendicular to the lip portion (horizontal end portion of the lip portions), wherein the plurality of step portions are spaced apart by a plurality of cut outs (133) in a non-uniform distance (see figure 3). Lin further discloses (figure 1 and column 3, lines 15-17) that the heat spreader, which includes the step, is made of copper or aluminum. Reference to Lin et al. (6,188,578) has been previously recited to

reject the claims in the Office Action sent 4/9/2003 and being moot in view of applicant's amendment filed 5/27/2003. However, applicant has broadened the scope of the claims in the amendment filed 1/20/2004 by deleting the limitation of "adjacent" in claim 1. Therefore, reference to Lin has been relied again to reject the claims since the plurality of step portions do not have to be adjacent to a single solid continuous lip portion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6-9,14 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Houle et al. (US 6,469,381). Lin discloses substantially all of applicant's claimed invention as discussed above except for the limitations of the material of the heat spreader's step portion and sealant is a silicone-based material. Lin further discloses (figure 3) that the heat spreader, which includes the body, the lip, and the step portion, are made of a unitary body of a single material. Houle discloses (figure 3, and column 3, line 67- column 4, line 10) that a heat spreader (305) is used to dissipate heat from a heat source (303) wherein the heat spreader (305) can be made of carbon/carbon composite or carbon/copper composite comprising a matrix carbon fibers composite to obtain a high thermal conductivity heat spreader with lighter weight than metal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in the Lin's heat spreader for the purpose of

obtaining a high thermal conductivity heat spreader with lighter weight than metal. As regarding claim 14, Lin discloses (figure 2) that the heat spreader is bonded on the substrate (11) by a sealant (15) but not that the sealant material is of silicone based material. Houle discloses (column 3, lines 42-59) that the heat spreader (305) can be bonded on a substrate (301) by a silicone-based sealant material (307) to provide a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in Lin's heat spreader to obtain a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal expansion.

Claims 10-13, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of Toy et al. (US 5,931,222). Lin substantially discloses all of applicant's claimed invention except for the limitation that the heat spreader is coated with nickel. Toy discloses (figure 1, column 7, lines 7-21 and column 10, lines 26-32) that an entire surface of heat spreader (18) is coated with nickel and specifically plated with gold at the leg portion (25) of the heat spreader to prevent corrosion on the heat spreader. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Toy's teaching in Lin's heat spreader to prevent corrosion on the heat spreader.

Claims 17 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin view of Lebonheur et al. (US 6,617,683). Lin discloses substantially all of applicant's claimed invention as discussed above except for the limitation that a thermal interface material of polymer is disposed between the die and the body portion of the heat spreader. Lebonheur discloses (figure 1 and column 3, lines 23-44) a thermal interface material of polymer (6) is

disposed between a heat spreader (3) and a die (2) to transfer heat generated from the die to the heat spreader (3) and to decouple the stress transfer between the heat spreader and the die. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Lebonheur's teaching in the Lin's heat spreader to transfer heat and to decouple the stress transfer between the die and the heat spreader.

Claims 1,5,16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bivona et al. (US 5,990,418) in view of Ramirez et al. (US 6,188,130). Bivona discloses (figures 1-2) an integrated heat spreader (104) constructed of aluminum or copper material and arranged to be adhesively affixed with a sealant (110) to a substrate (100), comprising a squared body portion (central planar surface); a solid continuous lip portion substantially vertical oriented relative to the body portion; and a continuous step portion perpendicular to the body portion. Bivona does not disclose a plurality of step portions, which are spaced apart by a plurality of cutouts. Ramirez discloses (figures 3 and 6, column 4, lines 58-65) a heat spreader (300) that has a plurality of step portions (301), which are spaced apart by a plurality of cutouts for the purpose of increasing the heat dissipation and improving adhesion to a substrate. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Ramirez's teaching in Bivona's heat spreader for the purpose of increasing the heat dissipation and improving adhesion to a substrate.

Claims 6-9,14 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bivona and Ramirez in view of Houle et al. (US 6,469,381). Bivona and Ramirez disclose substantially all of applicant's claimed invention as discussed above except for the limitations of

the materials of the heat spreader's step portion and sealant is a silicone-based material. Bivona further discloses (figure 2) that the heat spreader (104), which includes the body, the lip, and the step portion, are made of a unitary body of a single material. Houle discloses (figure 3, and column 3, line 67- column 4, line 10) that a heat spreader (305) is used to dissipate heat from a heat source (303) wherein the heat spreader (305) can be made of carbon/carbon composite or carbon/copper composite comprising a matrix carbon fibers composite to obtain a high thermal conductivity heat spreader with lighter weight than metal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in the combination device of Bivona and Ramirez for the purpose of obtaining a high thermal conductivity heat spreader with lighter weight than metal. As regarding claim 14, Bivona discloses (figure 2) that the heat spreader (104) is bonded on the substrate (100) by a sealant (110) but not that the sealant material is silicone based material. Houle discloses (column 3, lines 42-59) that the heat spreader (305) can be bonded on a substrate (301) by a silicone-based sealant material (307) to provide a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Houle's teaching in the combination device of Bivona and Ramirez to obtain a more flexible bond between the heat spreader and the substrate to compensate for their different coefficients of thermal expansion.

Claims 10-13, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bivona and Ramirez in view of Toy et al. (US 5,931,222). Bivona and Ramirez substantially disclose all of applicant's claimed invention except for the limitation that at least the plurality of step portions are coated with nickel. Toy discloses (figure 1, column 7, lines 7-21 and column

10, lines 26-32) that an entire surface of heat spreader (18) is coated with nickel and further plated with gold at the step portion (25) of the heat spreader to prevent corrosion on the heat spreader. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Toy's teaching in the combination device of Bivona and Ramirez to prevent corrosion on the heat spreader

Claims 17 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bivona and Ramirez in view of Lebonheur et al. (US 6,617,683). Bivona and Ramirez disclose substantially all of applicant's claimed invention as discussed above except for the limitation that a thermal interface material of polymer is disposed between the die and the body portion of the heat spreader. Lebonheur discloses (figure 1 and column 3, lines 23-44) a thermal interface material of polymer (6) is disposed between a heat spreader (3) and a die (2) to transfer heat generated from the die to the heat spreader (3) and to decouple the stress transfer between the heat spreader and the die. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use Lebonheur's teaching in the combination device of Bivona and Ramirez to transfer heat and to decouple the stress transfer between the die and the heat spreader.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

Tho Duong

February 25, 2004

Henry Bennett
Supervisory Patent Examiner
Group 3700